**PETITION FEE**  
**Under 37 CFR 1.17(f), (g) & (h)**  
**TRANSMITTAL**

(Fees are subject to annual revision)

Send completed form to: Commissioner for Patents  
P.O. Box 1450, Alexandria, VA 22313-1450

Application Number	10/643,312
Filing Date	August 18, 2003
First Named Inventor	NAKAMURA, Yasuaki
Art Unit	2186
Examiner Name	Unassigned
Attorney Docket Number	16869K-090400US

**Enclosed is a petition filed under 37 CFR §1.102(d) that requires a processing fee (37 CFR 1.17(f), (g), or (h)). Payment of \$ 130 is enclosed.**

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. For transmittal of processing fees under 37 CFR 1.17(i), see or PTO/SB/17i.

**Payment of Fees** (small entity amounts are NOT available for the petition fees)☒ The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 20-1430:☒ petition fee under 37 CFR 1.17(f), (g) or (h) ☒ any deficiency of fees and credit of any overpayments

Enclose a duplicative copy of this form for fee processing.

☐ Check in the amount of \$ \_\_\_\_\_ is enclosed.☐ Payment by credit card (Form PTO-2038 or equivalent enclosed). Do not provide credit card information on this form.**Petition Fees under 37 CFR 1.17(f): Fee \$400 Fee Code 1462**

For petitions filed under:

§ 1.53(e) - to accord a filing date.

§ 1.57(a) - to accord a filing date.

§ 1.182 - for decision on a question not specifically provided for.

§ 1.183 - to suspend the rules.

§ 1.378(e) - for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.

§ 1.741(b) - to accord a filing date to an application under § 1.740 for extension of a patent term.

**Petition Fees under 37 CFR 1.17(g): Fee \$200 Fee Code 1463**

For petitions filed under:

§ 1.12 - for access to an assignment record.

§ 1.14 - for access to an application.

§ 1.47 - for filing by other than all the inventors or a person not the inventor.

§ 1.59 - for expungement of information.

§ 1.103(a) - to suspend action in an application.

§ 1.136(b) - for review of a request for extension of time when the provisions of section 1.136(a) are not available.

§ 1.295 - for review of refusal to publish a statutory invention registration.

§ 1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.

§ 1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.

§ 1.550(c) - for patent owner requests for extension of time in ex parte reexamination proceedings.§ 1.956 - for patent owner requests for extension of time in inter partes reexamination proceedings.

§ 5.12 - for expedited handling of a foreign filing license.

§ 5.15 - for changing the scope of a license.

§ 5.25 - for retroactive license.

**Petition Fees under 37 CFR 1.17(h): Fee \$130 Fee Code 1464**

For petitions filed under:

§ 1.19(g) - to request documents in a form other than that provided in this part.

§ 1.84 - for accepting color drawings or photographs.

§ 1.91 - for entry of a model or exhibit.

☒ § 1.102(d) - to make an application special.

§ 1.138(c) - to expressly abandon an application to avoid publication.

§ 1.313 - to withdraw an application from issue.

§ 1.314 - to defer issuance of a patent.

  
SignatureGeorge B. F. Yee  
Typed or printed name  
Date37,478  
Registration No., if applicable



I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:

PATENT  
Attorney Docket No.: 16869K-090400US  
Client Ref. No.: 627 / SM /ss  
Hitachi Ref. No.: 340201235US01

On 7-22-05

TOWNSEND and TOWNSEND and CREW LLP

By: Elizabeth Nesbitt

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

Yasuaki Nakamura et al.

Application No.: 10/643,312

Filed: August 18, 2003

For: Disk Control System and Control  
Method of Disk Control System

Customer No.: 20350

Confirmation No. 4217

Examiner: Unassigned

Technology Center/Art Unit: 2186

RENEWED  
PETITION TO MAKE SPECIAL FOR  
NEW APPLICATION PURSUANT TO  
37 C.F.R. § 1.102(d) &  
M.P.E.P. § 708.02, Item VIII,  
ACCELERATED EXAMINATION

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

A petition to make special the above-identified application in accordance with MPEP § 708.02, Item VIII, accelerated examination was filed May 23, 2005. A decision mailed June 24, 2005 denied said petition.

Submitted herewith is a renewed petition to make special the above-identified application in accordance with MPEP § 708.02, Item VIII, accelerated examination. The application has not received any examination by the Examiner.

(A) The Commissioner is authorized to charge the petition fee of \$130 under 37 C.F.R. § 1.17(h), and any additional fees that may be associated with this petition may be charged to Deposit Account No. 20-1430.

(B) All the claims are believed to be directed to a single invention. If the examiner determines that all the claims presented are not obviously directed to a single invention, then Applicant will make an election without traverse as a prerequisite to the grant of special status where the specific grouping of claims will be determined by the examiner.

(C) A pre-examination search was performed by an independent patent search firm. A copy of the search report is provided herewith as Exhibit A. The pre-examination search includes a classification search, a computer database search, and a keyword search. The searches were performed on or around April 5, 2005. The classification search covered Class 707, subclass 1 and Class 711, subclasses 113, 114, 154, 165, and 203. Additionally, a keyword search was performed on the USPTO full-text database, including published applications. The following references were identified in the search report:

- (1) U.S. Patent Nos.:
  - 6,532,527 Selkirk et al.
  - 6,697,866 Arakawa et al.
- (2) U.S. Patent Application Publication Nos.:
  - 2001/0020254 Blumenau et al.
  - 2002/0143793 Voigt
  - 2003/0159058 Eguchi et al.
  - 2003/0191734 Voigt
  - 2004/0143832 Yamamoto et al.

(D) The above references are enclosed herewith, collectively as Exhibit B.

(E) Set forth below is a detailed discussion of the references, pointing out with particularity how the claimed subject matter recited in the claims, amended according to the preliminary amendment filed herewith, is distinguishable over the references.

#### **Claimed Subject Matter of the Present Invention**

Independent **claim 1** recites a disk control system that receives a process command for writing or reading of data from an information processing device. The process command specifies a logical unit. The disk control system performs a write or read process of data with a logical device corresponding to the logical unit. The disk control system manages

logical devices which are logical storage regions defined (set) on a storage region of a disk drive. A correspondence between logical devices and logical units is maintained in the disk control system. When a process command specifies a logical unit that has no corresponding logical device, then a logical device is assigned to the logical unit. The process command is then performed. The disk control system further will not assign a logical device to the specified logical unit if the process command does not cause a process with regard to a logical device. As explained on page 5, lines 18-25 in the specification as originally filed, a process command that does not cause a process with regard to a logical device refers to a command which can be performed on a logical unit even though that logical unit is not associated with a logical device.

Independent **claim 10** recites a control method for disk control system which manages logical devices defined on a storage region of a disk drive and maintains a correspondence between logical devices and logical units. When a process command (e.g., an I/O command) is received that specifies a logical unit, then a determination is made whether a logical device is assigned to the logical unit. If so, then the process command is performed with regard to the logical device. If not, then a logical device is associated with the specified logical unit and the process is performed with regard to that logical device.

Independent **claim 11** recites a control method for disk control system which manages logical devices defined on a storage region of a disk drive and maintains a correspondence between logical devices and logical units. The disk control system receives a process command (e.g., an I/O command) that specifies a logical unit. If a logical device is assigned to the logical unit, then the process command is performed with regard to the logical device. If a logical device is not assigned to the specified logical unit and the process command does not cause a process with regard to the logical device, then the process command is performed without assigning a logical device to the specified logical unit. If no logical device has been assigned to the specified logical unit and the process command causes a process with regard to the logical device, then the logical device is assigned to the logical unit and the process command is performed. As explained above, a process command that does not cause a process with regard to a logical device refers to a command which can be performed on a logical unit even though that logical unit is not associated with a logical device.

**U.S. Patent No. 6,532,527 Selkirk et al.**

The patent to Selkirk et al. (6,532,527), assigned to Storage Technology Corp., provides for Using Current Recovery Mechanisms to Implement Dynamic Mapping Operations. Disclosed is storage subsystem 200 that is a shared virtual array. Each physical storage device 202 in subsystem 200 may be represented to a data processing system such as client 108 as a number of virtual devices. A method for data unit/virtual device structure data processing methodology is presented. Data unit/VDS requirements interpretation is processed (step 506) and the data units/VDS requirements are processed to map methodologies for implementation (step 508). Virtual data units are communicated to the storage subsystem 200 or subsystems (step 512). Each storage subsystem creates a logical device structure to map the virtual data unit (step 514). Management interface 516 can manage data unit requirements inventory 522 and storage methodologies inventory 518. Interface 516 can also receive and provide input from/to stage subsystem capabilities inventory 520 (see figures 1, 2, 5; column 4, lines 48-52; column 8, lines 5-8, 12-19).

As to **claim 1**, the reference does not appear to teach or suggest a disk control system that assigns a logical device to a logical unit specified in a received process command when the specified logical unit is not already assigned to a logical device. The reference does not appear to teach or suggest that the disk control system, moreover, will not perform the operation of assigning a logical device to the specified logical unit if the received process command does not cause a process with regard to the logical device.

As to **claim 10**, the reference does not appear to teach or suggest a method for a disk control system that assigns a logical device to a logical unit specified in a received process command, when the specified logical unit is not already assigned to a logical device.

As to **claim 11**, the reference does not appear to teach or suggest a method for a disk control system that includes assigning a logical device to a logical unit specified in a received process command when the specified logical unit is not already assigned to a logical device. The reference does not appear to teach or suggest that the disk control system, moreover,

will not perform the operation of assigning a logical device to the specified logical unit if the received process command does not cause a process with regard to the logical device.

**U.S. Patent No. 6,697,866 Arakawa et al.**

The patent to Arakawa et al. (6,697,866), assigned to Hitachi, Ltd., provides for Access Control Method for Data Stored in Fixed-block Length Format in Computer Configurations Utilizing Variable Length Data format Interfaces. Disclosed is a method for increasing data transfer performance during read and write operations on fixed block length formatted data. Figures 2 and 3 show read and write processing. Figure 5 shows a sequence chart for an access protocol to access data stored in FBL format.

As to **claim 1**, the reference does not appear to teach or suggest a disk control system that assigns a logical device to a logical unit specified in a received process command when the specified logical unit is not already assigned to a logical device. The reference does not appear to teach or suggest that the disk control system, moreover, will not perform the operation of assigning a logical device to the specified logical unit if the received process command does not cause a process with regard to the logical device.

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**U.S. Publication No. 2001/0020254 Blumenau et al.**

The patent application to Blumenau et al. (2001/0020254) provides for a Method and Apparatus for Managing Access to Storage Devices in a Storage System with Access Control. Disclosed is a method for managing access to a shared resource by a plurality of devices that are coupled to the shared resource via a network. The method includes receiving in a storage system a non-media request by a first device to access a logical device for which the first device has no data access privileges. A determination is made whether the first device is authorized to have non-media access to the logical device. If authorization exists then the non-media access request is permitted. Figure 3 shows a storage system 20 which includes a volume allocation component 72. See paragraph [0060].

As to **claim 1**, the reference does not appear to teach or suggest a disk control system that assigns a logical device to a logical unit specified in a received process command when the specified logical unit is not already assigned to a logical device. The reference does not appear to teach or suggest that the disk control system, moreover, will not perform the operation of assigning a logical device to the specified logical unit if the received process command does not cause a process with regard to the logical device.

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**U.S. Publication No. 2002/0143793 Voigt**

The patent application to Voigt (2002/0143793) provides for a Method and Apparatus for Providing File System Access to a Disk Array. Disclosed is a virtual mapping

component 302 in a disk array (figure 4). The virtual mapping component is responsible for creating and assigning logical units for data to be stored across device array 203a. RAID component 303 is responsible for managing storage device array 203a and for communications with the virtual array mapping component. RAID component 303 also implements data storage redundancy schemes or RAID schemes supported by storage system 201. (see figure 7; paragraph 30).

As to **claim 1**, the reference does not appear to teach or suggest a disk control system that assigns a logical device to a logical unit specified in a received process command when the specified logical unit is not already assigned to a logical device. The reference does not appear to teach or suggest that the disk control system, moreover, will not perform the operation of assigning a logical device to the specified logical unit if the received process command does not cause a process with regard to the logical device.

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**U.S. Publication No. 2003/0159058 Eguchi et al.**

The patent application to Eguchi et al. (2003/0159058), assigned to Hitachi, Ltd., provides for a Method of Performing Active Data Copying Processing, and Storage Subsystem and Storage Control Apparatus for Performing Active Data Copying Processing. Disclosed is a storage subsystem coupled to a computer, comprising: a logical storage device to which an I/O process is performed by the computer; a judgment unit which determines whether an access to the logical storage device is permitted or not, in accordance with a data copy instruction from the



computer for a data copy process relative to the logical storage device. In the storage subsystem control unit 2200, upon reception of a read/write processing request for a physical storage device 2300, the logical/physical correspondence unit 2212 acquires a logical/physical correspondence by referring to the logical/physical storage area correspondence information 2211. The read/write unit 2210 performs a read/write processing relative to a proper storage area (see figure 2; paragraphs 26, 55).

As to **claim 1**, the reference does not appear to teach or suggest a disk control system that assigns a logical device to a logical unit specified in a received process command when the specified logical unit is not already assigned to a logical device. The reference does not appear to teach or suggest that the disk control system; moreover, will not perform the operation of assigning a logical device to the specified logical unit if the received process command does not cause a process with regard to the logical device.

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**U.S. Publication No. 2003/0191734 Voigt**

The patent application to Voigt (2003/0191734) provides for a Method and Program Product for Managing Data Access Routes in a Data Storage System Providing Multiple Access Routes. Disclosed is a virtual array mapping component 202 located in array controller processor 105 within data storage system 100 that provides array data management arrangement which relates data stored on storage devices 103 to logical units and to blocks of storage space. Virtual mapping component 202 can also be responsible for creating and

assigning logical units for the data to be stored across the device array 102. RAID management component 203 is responsible for managing the storage device array 102 and for communications with the virtual mapping component 202. For a read operation, array mapping component 202 determines the block allocations associated with the pre-existing file to be read. In a write operation, mapping component 202 maps the file data to blocks within the logical unit assigned to the file (see figures 1, 2; paragraphs 23, 29, 42).

As to **claim 1**, the reference does not appear to teach or suggest a disk control system that assigns a logical device to a logical unit specified in a received process command when the specified logical unit is not already assigned to a logical device. The reference does not appear to teach or suggest that the disk control system, moreover, will not perform the operation of assigning a logical device to the specified logical unit if the received process command does not cause a process with regard to the logical device.

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**U.S. Publication No. 2004/0143832 Yamamoto et al.**

The patent application to Yamamoto et al. (2004/0143832) provides for a Storage Unit, Installation Method Thereof and Installation Program Therefor. Discussed is a control memory that stores programs executed by a processor. Various kinds of management information such as logical device management information 126 for management of logical devices of a second storage unit 12a can be stored in the control memory. Logical device management information 126 manages the logical devices within second storage unit 12a. A

port number of the entry 25 is set with information indicating which port the logical device is connected with among a plurality of ports 123. A target ID and LUN are identifiers for identifying a logical device. When a host computer 11 accesses the device on SCSI, the target ID and LUN are used as a SCSI-ID and LUN, respectively. The control memory of storage 12a or 12b holds management information on an attribute of a WWN and the like of each port 123 (see figure 2; paragraphs 37, 46, 48).

As to **claim 1**, the reference does not appear to teach or suggest a disk control system that assigns a logical device to a logical unit specified in a received process command when the specified logical unit is not already assigned to a logical device. The reference does not appear to teach or suggest that the disk control system, moreover, will not perform the operation of assigning a logical device to the specified logical unit if the received process command does not cause a process with regard to the logical device.

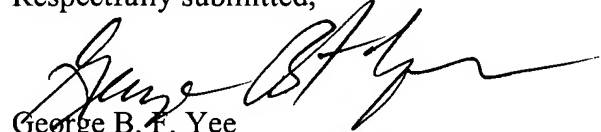
As to **claim 10**, the reference does not appear to teach or suggest a method for a disk control system that assigns a logical device to a logical unit specified in a received process command, when the specified logical unit is not already assigned to a logical device.

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**Conclusion**

In view of this comments presented in the instant petition and the claim amendments presented in the accompanying preliminary amendment, the Examiner is respectfully requested to issue a first Office Action at an early date.

Respectfully submitted,



George B. F. Yee  
Reg. No. 37,478

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GBFY  
60544240 v1



## EXHIBIT A

Search Report for  
Application No. 10/643,312; Filed August 18, 2003

**CONFIDENTIAL**  
**(Patentability Search)**

**I. SEARCH FEATURE**

A. General

Disk control system

B. Specific

A disk control system that receives a process command for writing or reading of data from an information processing device, and performs a write or read process of data with respect to a logical device corresponding to a logical unit specified by that process command, comprising:

means for managing, as units, logical devices, which are logical storage regions that have been set in a storage region provided by a disk drive;  
means for storing a correspondence between said logical devices and logical units, which are storage regions that have been set logically; and  
means for assigning, when a process command has been received for a logical unit to which no logical device has been assigned, a logical device to that logical unit and performing processing with regard to that logical device.

C. Application

Disk array processing in a storage system

**II. FIELD OF SEARCH**

The search of the above features was conducted in the following areas:

A. Classification search

<u>Class</u>	<u>Subclasses</u>	<u>Description</u>
707/		<b>DATA PROCESSING: DATABASE AND FILE MANAGEMENT OR DATA STRUCTURES</b>
	1	<b>DATABASE OR FILE ACCESSING</b>
711/		<b>ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MEMORY</b>
	113	....Caching

<u>Class</u>	<u>Subclasses</u>	<u>Description (continued)</u>
	114	....Arrayed (e.g., RAID's)
	154	.Control technique
	165	..Internal relocation
	203	..Virtual addressing

The above subclasses represent areas deemed to contain subject matter of interest to one or more of the search features. Please note that relevant references may be classified outside of these areas. The integrity of the search is based on the records as presented to us by the United States Patent and Trademark Office (USPTO). No further integrity studies were performed. Also a key word search was performed on the USPTO full-text database including published U.S. patent applications.

### III. RESULTS OF SEARCH

#### A. References developed as a result of search (related art is in boldface):

<u>U.S. Patent No.</u>	<u>Inventor</u>
6,532,527 B2	Selkirk et al.
6,697,866 B1*	Arakawa et al.

<u>U.S. Patent Application Publication No.</u>	<u>Inventor</u>
2001/0020254 A1	Blumenau et al.
2002/0143793 A1	<b>Voigt</b>
2003/0159058 A1*	<b>Eguchi et al.</b>
2003/0191734 A1	<b>Voigt</b>
2004/0143832 A1	<b>Yamamoto et al.</b>

#### B. Discussion of related references in numerical order:

The patent to Selkirk et al. (6,532,527 B2), assigned to Storage Technology Corp., provides for *Using Current Recovery Mechanisms to Implement Dynamic Mapping Operations*. Disclosed is storage subsystem 200 that is a shared virtual array. Each physical storage device 202 in subsystem 200 may be represented to a data processing system such as client 108 as a number of virtual devices. A method for data unit/virtual device structure data processing methodology is presented. Data unit/VDS requirements interpretation is processed (step 506) and the data units/VDS requirements are processed to map methodologies for implementation (step 508). Virtual data units are communicated to the storage subsystem 200 or subsystems (step 512). Each

storage subsystem creates a logical device structure to map the virtual data unit (step 514). Management interface 516 can manage data unit requirements inventory 522 and storage methodologies inventory 518. Interface 516 can also receive and provide input from/to stage subsystem capabilities inventory 520 (see figures 1, 2, 5; column 4, lines 48-52; column 8, lines 5-8, 12-19).

The patent application to Eguchi et al. (2003/0159058 A1), assigned to Hitachi, Ltd., provides for a *Method of Performing Active Data Copying Processing, and Storage Subsystem and Storage Control Apparatus for Performing Active Data Copying Processing*. Disclosed is a storage subsystem coupled to a computer, comprising: a logical storage device to which an I/O process is performed by the computer; a judgment unit which determines whether an access to the logical storage device is permitted or not, in accordance with a data copy instruction from the computer for a data copy process relative to the logical storage device. In the storage subsystem control unit 2200, upon reception of a read/write processing request for a physical storage device 2300, the logical/physical correspondence unit 2212 acquires a logical/physical correspondence by referring to the logical/physical storage area correspondence information 2211. The read/write unit 2210 performs a read/write processing relative to a proper storage area (see figure 2; paragraphs 26, 55).

The patent application to Voigt (2003/0191734 A1) provides for a *Method and Program Product for Managing Data Access Routes in a Data Storage System Providing Multiple Access Routes*. Disclosed is a virtual array mapping component 202 located in array controller processor 105 within data storage system 100 that provides array data management arrangement which relates data stored on storage devices 103 to logical units and to blocks of storage space. Virtual mapping component 202 can also be responsible for creating and assigning logical units for the data to be stored across the device array 102. RAID management component 203 is responsible for managing the storage device array 102 and for communications with the virtual mapping component 202. For a read operation, array mapping component 202 determines the block allocations associated with the pre-existing file to be read. In a write operation, mapping component 202 maps the file data to blocks within the logical unit assigned to the file (see figures 1, 2; paragraphs 23, 29, 42) Note: Inventor related U.S. patent application 2002/0143793 is similar.

The patent application to Yamamoto et al. (2004/0143832 A1) provides for a *Storage Unit, Installation Method Thereof and Installation Program Therefor*. Discussed is a control memory that stores programs executed by a processor. Various kinds of management information such as logical device management information 126 for management of logical devices of a second storage unit 12a can be stored in the control memory. Logical device management information 126 manages the logical devices within second storage unit 12a. A port number of the entry 25 is set with information indicating which port the logical device is connected with among a plurality of ports 123. A target ID and



LUN are identifiers for identifying a logical device. When a host computer 11 accesses the device on SCSI, the target ID and LUN are used as a SCSI-ID and LUN, respectively. The control memory of storage 12a or 12b holds management information on an attribute of a WWN and the like of each port 123 (see figure 2; paragraphs 37, 46, 48).

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Sejal Gangar



## EXHIBIT B

Table of Contents and References for  
Application No. 10/643,312; Filed August 18, 2003

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U.S. Patent Application Publication No. 2002/0143793 A1 to Voigt .....	4
U.S. Patent Application Publication No. 2003/0159058 A1 to Eguchi et al. ....	5
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